



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/468,469

12/21/1999

REGINALD V. BLUE

3674

7590

12/12/2005

ROCCO L ADORNATO
UNISYS CORP
TOWNSHIP LINE & UNION MEETING ROADS
BLUE BELL, PA 19424

EXAMINER

ALI, SYED J

ART UNIT

PAPER NUMBER

2195

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/468,469	BLUE, REGINALD V.	
	Examiner	Art Unit	
	Syed J. Ali	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed July 25, 2005. Claims 1-45 are presented for examination.

2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 18-29 and 37-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.**

5. Claims 18 and 37 indicate that the first critical section is always available unless another thread is writing to the resource for which a lock is desired. This claim limitation is inconsistent with Applicant's disclosure. On page 21, lines 11-17 of Applicant's specification, it is provided that the first critical section may in fact be unavailable when another thread is acquiring a read lock, e.g. two reader threads attempt to acquire the lock nearly simultaneously and the second reader has to wait for the first reader to relinquish the critical section before it can acquire the

Art Unit: 2195

lock. Though the first critical section is released “in a very short amount of time”, the critical section is nonetheless unavailable until the first reader relinquishes it. Thus, the first critical section would be unavailable, albeit briefly, even though there are no writer threads.

6. In treating the new limitations of claims 18 and 37 on the merits, the meaning attached will be the intended effect conveyed within the specification. Claims 19-29 and 38-45 are rejected for at least the same reasons as their parent claims, as they fail to present any limitations that resolve the deficiencies of the claims from which they depend.

7. **Claims 11, 29, 36, and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

8. As per claims 11, 29, 36, and 45 the claims are phrased in such a way as to present what should be independent claims as dependent claims. Any claim which is in dependent form but which is so worded that it, in fact, is not a proper dependent claim will be required to be canceled as not being a proper dependent claim; and cancellation of any claim depending on such a dependent claim will be similarly required. The applicant may thereupon amend the claims to place them in proper dependent form, or may redraft them as independent claims, upon payment of any necessary additional fee. MPEP §607.

9. For instance, claim 1 is directed to a method of managing resources, while claim 11 is directed to a computer readable medium storing instructions that perform the method of claim 1. Claim 1 clearly falls within the statutory category of “process”, while claim 11 is either a

Art Unit: 2195

“machine” or “manufacture”. However, as claim 11 is dependent upon claim 1, they should be within the same category of invention. As the claims currently stand, claims 11, 29, 36, and 45 are independent claims that are presented in dependent form and are considered improper.

Claim Rejections - 35 USC § 102

10. Claims 1-11, 18-29, and 37-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Oliver (USPN 6,029,190).

11. As per claim 1, Oliver teaches the invention as claimed, including a method of managing a resource shared among concurrently executing threads in a multi-threaded computer program running under an operating system that supports multi-threaded computer programs, said method comprising the acts of:

receiving, from a first thread, a request for a lock, said request indicating whether said request is for a read lock or a write lock (col. 2 lines 52-63; col. 4 lines 15-17);

if said request is for a read lock, granting said request and permitting said thread to proceed (col. 3 lines 2-3) unless another of said threads is writing said resource (col. 2 lines 65-67); and

if said request is for a write lock, granting said request and permitting said thread to proceed (col. 3 lines 64-66) unless another of said threads is reading or writing said resource (col. 4 lines 2-4).

12. As per claim 2, Oliver teaches the invention as claimed, including the method of claim 1, wherein said request is issued by creating a local class instance, wherein a constructor for said class instance issues said request (col. 6 lines 35-38, 43-46).

13. As per claim 3, Oliver teaches the invention as claimed, including the method of claim 2, wherein said class instance is a class instance in the C++ programming language (col. 6 lines 35-38).

14. As per claim 4, Oliver teaches the invention as claimed, including the method of claim 2, further comprising the act of destroying said local class instance, wherein a destructor for said class instance issues a request to release said lock (col. 6 lines 43-46).

15. As per claim 5, Oliver teaches the invention as claimed, including the method of claim 1, further comprising determining whether other threads are reading or writing the resource, wherein the determination of whether other threads are reading or writing from said resource are made by claiming one or more critical sections (col. 4 lines 34-36, 41-45).

16. As per claim 6, Oliver teaches the invention as claimed, including the method of claim 5, wherein said critical sections are implemented by way of a critical section facility of said operating system (col. 1 lines 25-29, see also paragraph 53 below).

17. As per claim 7, Oliver teaches the invention as claimed, including the method of claim 5, further comprising the act of incrementing a counter (col. 3 lines 6-9).

18. As per claim 8, Oliver teaches the invention as claimed, including the method of claim 7, wherein the value of said counter is the number of read locks outstanding on said resource (col. 3 lines 6-9).

19. As per claim 9, Oliver teaches the invention as claimed, including the method of claim 8, wherein the act of claiming at least one of said critical sections is conditioned upon the value of said counter (col. 3 lines 39-43, 64-66).

20. As per claim 10, Oliver teaches the invention as claimed, including the method of claim 1, wherein said resource comprises a data object located within the address space of said computer program (col. 1 lines 13-16).

21. As per claim 11, Oliver teaches the invention as claimed, including a computer-readable medium having computer-executable instructions to perform the method of claim 1 (col. 1 lines 7-10).

22. As per claim 18, Oliver teaches the invention as claimed, including a method of managing a resource shared among a plurality of concurrently executing threads, comprising the acts of:

claiming a first critical section, wherein said first critical section is unavailable to a thread seeking to do a write to said resource and to a thread seeking to do a read from said resource whenever any of said threads is presently writing to said resource (col. 2 lines 63-65; col. 3 lines 64-66), and wherein said first critical section is always available to a thread seeking to do a write to said resource and to a thread seeking to do a read from said resource whenever none of said threads is presently writing to said resource (col. 2 line 65 - col. 3 line 3; col. 3 line 64 - col. 4 line 4);

if said first critical section is unavailable, waiting at least until said first critical section becomes available (col. 2 line 67 - col. 3 line 2; col. 3 line 66 - col. 4 line 4);

claiming a second critical section, wherein said first critical section is unavailable to a thread seeking to do a write to said resource whenever any of said threads is presently reading from said resource (col. 3 lines 11-14; col. 4 lines 4-10);

if said second critical section is unavailable, waiting at least until said second critical section becomes available (col. 4 lines 2-4); and

executing at least one instruction that accesses said resource (col. 3 lines 17-18; col. 4 line 11).

23. As per claim 19, Oliver teaches the invention as claimed, including the method of claim 18, wherein said threads are threads of a single multi-threaded computer program (col. 1 lines 13-16).

Art Unit: 2195

24. As per claim 20, Oliver teaches the invention as claimed, including the method of claim 18, wherein said critical sections are implemented by way of a critical section facility of an operating system (col. 1 lines 25-29, see also paragraph 53 below).

25. As per claim 21, Oliver teaches the invention as claimed, including the method of claim 18, wherein said at least one executed instruction that accesses said resource is a write access (col. 3 lines 44-45), and wherein said method further comprises the acts of:

relinquishing said second critical section (col. 4 lines 8-10); and

after performing said executed instruction, relinquishing said first critical section (col. 4 lines 8-10).

26. As per claim 22, Oliver teaches the invention as claimed, including the method of claim 18, wherein said at least one executed instruction that accesses said resource is a read access (col. 2 lines 50-51), and wherein said method further comprises the acts of:

relinquishing said first critical section (col. 3 lines 14-16); and

after performing said executing act, relinquishing said second critical section, unless another set of instructions is presently reading from said resource (col. 3 lines 30-37).

27. As per claim 23, Oliver teaches the invention as claimed, including the method of claim 22, wherein the determination of whether any set of instructions is presently reading from said resource is made by testing the value of a counter (col. 3 lines 39-43, 64-66).

Art Unit: 2195

28. As per claim 24, Oliver teaches the invention as claimed, including the method of claim 18, further comprising the acts of:

creating a local class instance (col. 6 lines 35-38, 43-46); and

after said executing said executed instruction, destroying said local class instance (col. 6 lines 35-38, 43-46);

wherein said claiming acts are invoked by the constructor for said local class instance, and wherein the destructor for said local class instance relinquishes at least one of the critical sections (col. 6 lines 35-38, 43-46).

29. As per claim 25, Oliver teaches the invention as claimed, including the method of claim 24, wherein said local class instance is a C++ class (col. 6 lines 35-38, 43-46), wherein said act of creating a local class instance comprises opening a local scope in a program in the C++ programming language (col. 6 lines 35-38, 43-46), and wherein said act of destroying said local class instance comprises closing said local scope (col. 6 lines 35-38, 43-46).

30. As per claim 26, Oliver teaches the invention as claimed, including the method of claim 18, further comprising the act of incrementing a counter (col. 3 lines 6-9), wherein said act of claiming said second critical section is conditioned upon the value of said counter (col. 3 lines 39-43, 64-66).

31. As per claim 27, Oliver teaches the invention as claimed, including the method of claim 18, further comprising the acts of claiming and relinquishing a third critical section, wherein said third critical section is relinquished prior to executing said one instruction (col. 4 lines 62-65).

32. As per claim 28, Oliver teaches the invention as claimed, including the method of claim 18, wherein said resource comprises a data object located within the address space of a computer program (col. 1 lines 13-16).

33. As per claim 29, Oliver teaches the invention as claimed, including a computer-readable medium having computer-executable instructions to perform the method of claim 18 (col. 1 lines 7-10).

34. As per claim 37, Oliver teaches the invention as claimed, including a method of managing a resource in a computing environment that supports concurrent execution of a plurality of sets of computer-executable instructions, said method comprising:

(a) issuing, in a first set of instructions, a first request for said first of said sets of instructions to obtain a lock on said resource, wherein said request comprises an indication as to whether said first of said sets of instructions needs a read lock on said resource or a write lock on said resource (col. 2 lines 52-63; col. 4 lines 15-17);

(b) claiming a first critical section (col. 3 lines 2-3; col. 3 line 66 - col. 4 line 2), wherein said first critical section is unavailable to said first set of instructions whenever any of said sets of instructions is presently writing to said resource (col. 2 lines 65-67),

and wherein said first critical section is always available to said first set of instructions whenever none of said sets of instructions is presently writing to said resource (col. 2 line 65 - col. 3 line 3; col. 3 line 64 - col. 4 line 4);

(c) if said indication is that said first set of instructions needs a write lock on said resource (col. 3 lines 45-46):

(c)(1) claiming a second critical section (col. 3 line 66 - col. 4 line 2); and

(c)(2) relinquishing said second critical section (col. 4 lines 8-10);

whereupon said write lock is granted to said first set of instructions (col. 3 lines 64-66);

and

(d) if said indication is that said first of said sets of instructions needs a read lock on said resource (col. 2 lines 50-51):

(d)(1) relinquishing said first critical section (col. 3 lines 14-16); and

(d)(2) if no other one of said plurality of sets of instructions, exclusive of said first of said sets of instructions, has a read lock on said resource, claiming said second critical section (col. 3 lines 11-12);

whereupon said read lock is granted to said first set of instructions (col. 2 lines 63-65).

35. As per claim 38, Oliver teaches the invention as claimed, including the method of claim 37, wherein said sets of instructions are threads of a single computer program executing under an operating system (col. 1 lines 13-16), and wherein said critical sections are implemented by way of the critical section facility of said operating system (col. 1 lines 25-29, see also paragraph 53 below).

36. As per claim 39, Oliver teaches the invention as claimed, including the method of claim 37, further comprising the acts of:

after said act of issuing said first request, claiming a third critical section (col. 4 lines 61-66); and

before, or contemporaneously with, the granting of a lock, relinquishing said third critical section (col. 4 lines 61-66).

37. As per claim 40, Oliver teaches the invention as claimed, including the method of claim 37, further comprising the acts of:

(e) issuing, in said first set of instructions, a second request to release said lock (col. 3 lines 21-23);

(f) if said lock is a read lock and no other one of said sets of instructions, exclusive of said first set of instructions, presently has a read lock on said resource, relinquishing said second critical section (col. 3 lines 30-37); and

(g) if said lock is a write lock, relinquishing said first critical section (col. 4 lines 12-14).

38. As per claim 41, Oliver teaches the invention as claimed, including the method of claim 40, further comprising the acts of:

creating a local class instance (col. 6 lines 35-38, 43-46); and

destroying said local class instance (col. 6 lines 35-38, 43-46);

wherein said first request is issued by the constructor for said class instance (col. 6 lines 35-38, 43-46), and said second request is issued by the destructor for said class instance (col. 6 lines 35-38, 43-46).

39. As per claim 42, Oliver teaches the invention as claimed, including the method of claim 41, wherein said class instance is a class instance in the C++ programming language (col. 6 lines 35-38).

40. As per claim 43, Oliver teaches the invention as claimed, including the method of claim 40, further comprising the acts of incrementing and decrementing a counter (col. 3 lines 6-9, 30-33), wherein the value of said counter is the number of read locks outstanding on said resource (col. 3 lines 6-9), and wherein said indication of whether any other of said sets of instructions has a read lock on said resource are made by testing the value of said counter (col. 3 lines 39-43, 64-66).

41. As per claim 44, Oliver teaches the invention as claimed, including the method of claim 37, wherein said resource comprises a data object located within the address space of a computer program (col. 1 lines 13-16).

42. As per claim 45, Oliver teaches the invention as claimed, including a computer-readable medium having computer-executable instructions to perform the method of claim 37 (col. 1 lines 7-10).

Claim Rejections - 35 USC § 103

43. Claims 12-17 and 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oliver.

44. As per claim 12, Oliver teaches the invention as claimed, including a system for managing the use of a resource shared among concurrently-executing threads, said system comprising:

a record for maintaining information as to whether any of said threads is accessing a resource at a given point in time (col. 3 lines 9-16; col. 4 lines 8-10), said record comprising a read counter (col. 3 lines 5-9);

an object, which comprises or references:

a constructor, said constructor comprising computer-executable instructions to obtain a lock on said resource, to record said lock in said record (col. 2 lines 63-65; col. 6 lines 43-46), to increment said read counter when any of said threads reads from said resource (col. 3 lines 5-9); and

a destructor, said destructor comprising a set of computer-executable instructions to release said lock, to record the release of said lock in said record (col. 3 lines 14-16; col. 6 lines 43-46), and to decrement said read counter (col. 3 lines 30-33);

wherein the constructor instructions are executed upon creation of an instance of said object within a local scope, wherein the destructor instructions are executed upon the exiting of

Art Unit: 2195

said local scope, and wherein no instruction, other than an instruction to exit said local scope, is required to release said lock (col. 6 lines 35-38, 43-46).

45. It is noted that Oliver does not teach a write counter to track the number of outstanding write locks. However, Applicant's specification indicates that under no circumstance can the number of writer threads be greater than one; accordingly, the write counter could just as easily be implemented using a two-state variable (see Applicant's specification, pg. 20 lines 19-23). Although Oliver does not implement a write counter, Oliver implements a write lock using the alternative method discussed by Applicant, i.e. a two-state variable (semaphore). The semaphore is only available when there are no outstanding read or write locks (Fig. 1, element 136). Therefore, it would have been obvious to a person having ordinary skill in the art that Oliver suggests implementing a write counter by way of a two-state semaphore.

46. As per claim 13, Oliver teaches the invention as claimed, including the system of claim 12, wherein said constructor further comprises an instruction to claim a critical section (col. 4 lines 34-36, 41-45; col. 6 lines 35-38, 43-46), and wherein said destructor further comprises an instruction to relinquish said critical section (col. 4 lines 62-66; col. 6 lines 35-38, 43-46).

47. As per claim 14, Oliver teaches the invention as claimed, including the system of claim 13, wherein said critical section is implemented by way of a critical section facility of an operating system (col. 1 lines 25-29, see also paragraph 53 below).

48. As per claim 15, Oliver teaches the invention as claimed, including the system of claim 13, wherein said constructor further comprises instructions to condition the claiming of said critical section upon the value of said read counter (col. 3 lines 35-43; col. 6 lines 43-46), and wherein said destructor further comprises instructions to condition the relinquishment of said critical section upon the value of said read counter (col. 3 lines 34-37; col. 6 lines 43-46).

49. As per claim 16, Oliver teaches the invention as claimed, including the system of claim 12, wherein said object is a class object in the C++ programming language (col. 6 lines 35-38, 43-46).

50. As per claim 17, Oliver teaches the invention as claimed, including the system of claim 12, wherein said resource comprises a data object located within the address space of a computer program (col. 1 lines 13-16).

51. As per claim 30, Oliver teaches the invention as claimed, including a method of managing a resource in a computer environment that supports concurrent execution of a plurality of sets of computer-executable instructions, said method comprising:

in a one of said set of instructions:

opening a local scope (col. 6 lines 35-38, 43-46);

creating an object instance within said local scope, wherein said instance comprises or references a constructor method, and wherein said constructor method comprises instructions to obtain a read lock or a write lock on said resource (col. 2 lines

63-65; col. 6 lines 35-38, 43-46), to increment a read counter when obtaining said read lock (col. 3 lines 5-9);

performing, subsequent to creating said instance, one or more operations, wherein at least one of said operations reads from or writes to said resource (col. 4 lines 41-45; col. 6 lines 35-38, 43-46); and, when none of said plurality of sets of computer executed instructions seeks to read from or write to said resource,

closing said local scope, whereupon said instance is destroyed, said instance further comprising or referencing a destructor method, and wherein said destructor method comprises instructions to release said read lock or said write lock (col. 4 lines 62-65; col. 6 lines 35-38, 43-46).

52. As per claim 31, Oliver teaches the invention as claimed, including the method of claim 30, wherein said instructions are written in the C++ programming language, and wherein said object instance is a class instance in the C++ programming language (col. 6 lines 35-38, 43-46).

53. As per claim 32, Oliver teaches the invention as claimed, including the method of claim 30, wherein said constructor further comprises an instruction to claim a critical section (col. 4 lines 34-36, 41-45).

54. As per claim 33, Oliver teaches the invention as claimed, including the method of claim 32, wherein said sets of instructions are threads of a single multi-threaded computer program executing under an operating system (col. 1 lines 13-16), and wherein said critical sections are

Art Unit: 2195

implemented by way of the critical section facility of said operating system (col. 1 lines 25-29, see also paragraph 53 below).

55. As per claim 34, Oliver teaches the invention as claimed, including the method of claim 30, wherein a value of said read counter is a number of read locks outstanding on said resource (col. 3 lines 6-9).

56. As per claim 35, Oliver teaches the invention as claimed, including the method of claim 30, wherein said resource comprises a data object located within the address space of a computer program (col. 1 lines 13-16).

57. As per claim 36, Oliver teaches the invention as claimed, including a computer-readable medium having computer-executable instructions to perform the method of claim 30 (col. 1 lines 7-10).

Response to Arguments

58. **Applicant's arguments with respect to claims 12-17 and 30-36 have been considered but are moot in view of the new grounds of rejection.**

59. **Applicant's arguments filed July 25, 2005 with respect to claims 1-11, 18-29, and 37-45 have been fully considered but they are not persuasive.**

60. Applicant argues that Oliver does not teach or suggest allowing multiple simultaneous reader threads to acquire a read lock on a resource because Oliver states that a read request cannot proceed when the mutex has been obtained by another reader thread. Applicant cites this disclosure in support of the argument that Oliver stops a read request from proceeding if another thread holds the mutex.

61. Applicant's argument seems to reflect a misunderstanding of the distinction between a mutex and a lock. This is reflected by Applicant's own disclosure, which clearly states that a reader thread may have to wait briefly to acquire a lock if another reader thread is simultaneously locking the resource (Applicant's specification, pg. 21 lines 11-17). The first read thread locks out the second read thread for such a negligible amount of time that Applicant considers the wait time essentially irrelevant. Every thread must claim the write and main critical sections before locking a resource, whether it is a read or write lock. In exactly the same manner, every thread in Oliver must obtain at least the mutex before obtaining a lock on a resource. In the event that a subsequent read thread desires a lock on a resource while another read thread holds the mutex, the subsequent reader must wait until the mutex is released, which will be in a very brief amount of time. This manner of having multiple read locks is performed in exactly the same manner as claimed. Obtaining a mutex is just one step in the process of obtaining a lock. Applicant has essentially equated obtaining a mutex with obtaining a lock; closer reading of Oliver and Applicant's specification indicate that this is an erroneous understanding of both Oliver and the claimed invention (Oliver, col. 2 lines 52-67, "The first step in obtaining a read lock is to check for the availability of the mutex"; Applicant's specification, pg. 21 lines 11-17, "it is also

possible that the WRITE critical section is unavailable because it has been claimed by a thread that is in the process of requesting a read lock”).

62. With respect to claims 18 and 37, Applicant argues that Oliver fails to teach or suggest a first critical section that is: (1) unavailable when any of the threads are writing to the resource; and (2) always available when none of the threads are writing to the resource. Applicant contends that the mutex of Oliver cannot be considered analogous to the first critical section because the mutex may be unavailable to a second read thread while a preceding read thread holds the mutex.

63. As discussed above in paragraphs 5 and 61, Applicant has mischaracterized the claimed invention. Applicant presents a two-pronged requirement of the claimed “first critical section.” The first prong is not in dispute. If any thread is writing to the resource, the claimed “first critical section” is unavailable, just as the mutex in Oliver is unavailable as long as a write lock is outstanding (Fig. 2 elements 250, 260, the mutex is released after the write/modify step is complete). However, it is possible for the claimed “first critical section” to be unavailable when there are no threads writing to the resource, if a reader thread is in the process of acquiring a read lock (Applicant Fig. 5, elements 22-24, wherein a read thread may be forced to hang at step 22 until a preceding read has progressed past step 24). In a similar fashion, Oliver may force a reader thread to hang (Fig. 1 element 112) until a preceding reader thread has released the mutex (Fig. 1 element 122). The lock is always available if there is no write lock outstanding; the mutex and the claimed “first critical section” may be temporarily unavailable, however. The mutex in Oliver functions in exactly the same manner as the combination of the claimed first and

Art Unit: 2195

second critical sections. If the mutex is thought of as encompassing both critical sections, it becomes apparent how the claimed invention is exactly the same manner as Oliver (compare Oliver Figs. 1-2 with Applicant's Figs. 5-6).

Conclusion

64. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J. Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T. An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2195

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Syed Ali
November 28, 2005



MENG-AI LAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2